CLAIMS

WE CLAIM:

1. A method for optimizing communication on a network comprising a master device and a slave device, each device utilizing TCP and IP protocols, the method comprising the steps of:

transmitting a request message from the master device, the request message having a first part;

transmitting a response message from the slave device, the response message being responsive to the first part of the request message; and,

limiting the request message and the response message to a length that is less than both a TCP transaction length and a maximum transmission unit.

2. The method of claim 1 wherein MODBUS is utilized as an application layer protocol.

3. The method of claim 2 further including:

designating a set of predetermined response messages comprising at least one predetermined response message, each predetermined response message being distinguishable by the first part of the request message; and,

selecting a predetermined response message in response to the first part of the request message wherein the predetermined response message is rapidly determined from the content of the first part of the request message for quickly responding to the request message.

4. The method of claim 3 wherein the set of predetermined response messages comprises a response message to an address resolution protocol request message.

5. The method of claim 3 wherein the set of predetermined response messages comprises a response message to an Internet control management protocol request message.

6. The method of claim 3 wherein the set of predetermined response messages comprises a response message to a TCP connection request message.

7. The method of claim 3 wherein the set of predetermined response messages comprises a response message to a TCP disconnect request message.

8. The method of claim 3 wherein the set of predetermined response messages comprises a response message to a MODBUS request message as a TCP data frame.

9. The method of claim 1 wherein the message is received exclusively on TCP port number 502.

10. The method of claim 9 further including ignoring any message that is not transmitted via a TCP port number 502.

11. A network communication system comprising:

a master device for initiating a request message;

a slave device being exclusively responsive to the request message of the master device; and,

an optimal protocol utilized to communicate the request message and the response message between the master and the slave devices, the optimal protocol comprising:

an IP protocol;

a TCP protocol; and,

an application layer protocol wherein the building and parsing of the response message is responsive to a first part of the request message.

12. The network communication system of claim 11 wherein the application layer protocol is MODBUS.

13. The network communication system of claim 11 wherein the response message is responsive to the content of the first part of the request message.14. The network communication system of claim 11 wherein the master device exclusively initiates the request message.

14. The network communication system of claim 11 wherein the master device exclusively initiates the request message.

15. The network communication system of claim 11 further comprising a set of predetermined response messages including at least one predetermined response message, each predetermined response message being distinguishable by the first part of the request message wherein the predetermined response message is determined from the content of the first part of the request message and rapidly selected for quickly responding to the request message.

16. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to an address resolution protocol request message.

17. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to an Internet control management protocol request message.

18. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to a TCP connection request message.

19. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to a TCP disconnect request message.

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20. The network communication system of claim 15 wherein the set of predetermined response messages comprises a response message to a MODBUS request message as a TCP data frame.

21. The network communication system of claim 11 wherein each device limits its message to a length that is less than both a TCP transaction length and a maximum transmission unit.

22. The network communication system of claim 11 wherein the optimal protocol exclusively utilizes a TCP port number 502.

23. The network communication system of claim 22 wherein any message not transmitted via the TCP port number 502 is ignored.

24. A high performance Ethernet module comprising:

an Ethernet controller operably coupled to a network connection;

a control processing unit operably coupled to the Ethernet controller; and,

an optimal communication stack that executes on the control processing unit, the optimal communication stack being capable of simultaneously processing a TCP protocol, an IP protocol and an application layer protocol, the simultaneous processing further including building and parsing a communication message dependent upon a predetermined index of the message.

25. The Ethernet module of claim 24 wherein the application layer protocol is MODBUS.

26. The Ethernet module of claim 25 wherein the communication message is limited to a length that is less than both a TCP transaction length and a maximum transmission unit.

27. The Ethernet module of claim 24 wherein the optimal communication stack is configured to quickly provide a response message responsive to a request message.

28. The Ethernet module of claim 27 wherein the communication message further comprises the request message having a first portion and the response message being responsive to the first portion of the request message wherein the response message is determined from the content of the first portion of the request message and rapidly selected for responding to the request message.

29. The Ethernet module of claim 27 wherein the communication message is limited to a length that is less than both a TCP transaction length and a maximum transmission unit.

30. The Ethernet module of claim 24 wherein the communication protocol exclusively utilizes a TCP port number 502.

31. The Ethernet module of claim 24 wherein the control processing unit is operably coupled to a factory automation device.